Translation of the pertinent portions of a response by KBA, dtd. 12/16/2004

**RESPONSIVE TO THE NOTIFICATION OF 10/27/2004, AMENDMENTS UNDER ART. 34 PCT ARE BEING FILED**

1. The following are being filed:

1.1 Claims
(Replacement pages 26 and 36, version of 12/16/2004)

1.1.1 Claim 4

New claim 4 is formed from claims 4 and 5 of the version of 09/05/2003.

1.1.2 New claim 5

New claim 5 is formed from the characteristics which can be analogously taken from the specification on page 8, last paragraph, to page 9, first paragraph.

1.1.3 Claims 15 and 45

Claims 15 and 45 have been clarified by including characteristics in the specification on page 5, paragraph 2, or in respect to the differentiation between the drive unit 08 assigned to the motor M and the lower-order drive control unit 17, which differs from it, and were complemented by "specifying the master shaft position by the higher-order control unit". Claim 15 was additionally complemented by a signal analogously taken from page 12, paragraph 1.

1.1.4 Claim 30 and new claim 51

The subject of claim 30 was clarified by characteristics from the specification on page 20, last paragraph, to page 21, first paragraph, and complemented by a new dependent claim 51 from the specification, page 21, paragraph 2.

1.1.5 Claim 31

Claim 31 was clarified by characteristics from the specification on page 18, last paragraph.

1.1.6 Claims 1 to 3, 6 to 14, 16 to 29, 32 to 44 and 46 to 50 remain unchanged, except for required conformity of their dependencies to original claim 5 (now 4).

1.2 Preamble of the Specification
(Replacement pages 1, 2, added page 2a, version of 12 16/2004).

D1 and D2 were acknowledged.

2. Re.: The Cited References

2.1 Re.: D1 (WO 97/118481)

D1 shows the architecture of a drive system, in accordance with which the individual drive units of the printing press are connected with an electronic shaft via a first bus, and additionally with a parametrization bus for parametrization. It criticizes the drive architecture of EP 0 567 741 A1, wherein the guide system is split into a higher-order guide system and autonomous print location groups, wherein the synchronization of the print location groups takes place from a folder. Each one of these print location groups in EP 0 567 741 A1 has a drive system which is connected with the signal-emitting guide system and provides the positioning of the individual drive units in relation to each other and to the folder.

In D1 itself, signals processed by the higher-order control (10) for each drive unit are provided with the actual angular value by the synchronization bus. There is no lower-order control unit which takes over this job for a group of drive units and in this way relieves the bus (44). Because of this, the system easily approaches the limits of being capable of scaling.

2.2 Re.: D2 (US 2002/124743)

A drive system for a printing press is disclosed in D2, wherein drive data specifications are output to drive control units assigned to respective individual motors by means of data processing devices by a central operating and control unit via a data network.

It does not show an architecture, wherein a lower-order control device inserted into a higher-order control device is assigned to a group of drive control units of several motors.

3. Novelty and Inventive Activities

Claims 15 and 45 are directed to subjects which, in addition to the higher-order control device and to the drive control or regulation of each motor, have a lower-order control unit assigned to several motors. This architecture is neither disclosed nor suggested in D1 nor in D2. The advantage of this design lies in a high accuracy in spite of a large number of motors and in being scaleable. Although the control architecture criticized in D1 has lower-order control units, it receives its synchronization signal directly from the folder and not from its own higher-order control or computing unit specifically provided for generating pulses.

In contrast to the acknowledged EP 1 151 865 A2, the subject of claim 30 contains an advantage regarding synchronicity, and therefore the accuracy of the positions and concentricity in driving the press. Although the start position of the virtual shaft is fixed on one of the units - advantageously on a unit clamping the web, for example the folder -, subsequent operation takes place by means of a purely synthetically generated signal, without fluctuations in the rotating movement possibly caused by external forces - for example by the cut in the area of the folder - being able to find expression in the identical control of the remaining units. One skilled in the art is not prompted by EP 1 151 865 A2, nor by any other documents in the proceedings, to change EP 1 151 865 A2 in this sense.

Something similar to what was discussed in connection with claim 30 also applies to claim 31. If the angular position of the individual units in the course of operation is provided by the synthetically generated master shaft position, the positions of the master shaft and the unit - for example also that of the folder - are identical directly following the stop. In the course of a renewed start-up, for example following a plate change, the relative position of the stored master shaft position and of the folder are then still identical to a large degree, so that synchronization over a large angle range can be omitted. This alternative procedure is also not suggested by EP 1 151 865 A2 or another document.

Since documents D1 and D2 neither anticipate nor suggest the subjects of independent claims 4, 15, 30 and 31, these are novel and based on inventive activities.

4. Should doubts continue to exist on the part of the Examination Department regarding clarity and inventive activities in connection with the filed claims, an

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is requested prior to the preparation of the international preliminary examination report. Agreement regarding a date can be quickly established by calling 0931 / 909-61 05.

Enclosures

Claims, replacement pages 26 to 36,
Specification, replacement pages 1 and 2, added page 2a,
each in the version of 12/16/2004, in triplicate.

Drive Devices and Method for Driving a Processing Machine

Specification

The invention relates to drive unit arrangements and methods for driving a processing machine, in particular for processing webs, in accordance with the preambles of claims 1, 4, 15, or 30, 31, 33, 43 and 45.

A drive unit arrangement is known from DE 37 30 625 A1, wherein a primary station is assigned to each print unit, or to the folder of a printing press, which receives operating set points from a higher-order control device and passes them on to the secondary stations of the components involved.

DE 42 14 394 C2 discloses a drive unit arrangement for a printing press without a longitudinal shaft, wherein the folder is connected in respect to data with the groups of print locations via a bus. The folder provides its position reference to the groups of print locations. A drive control, which is common for the drive units of a single group of print locations, performs the fine adjustment of these drive units in respect to each other, as well as in relation to the folder.

A drive connection is known from EP 1 287 987 A1, wherein set points for angle positions and for speeds are generated for the individual drive units and are transmitted to all drive units at predetermined time intervals via a network.

A drive control mechanism is known from EP 1 151 865

A2, wherein actual master shaft pulses, as well as phase corrections, for the individual drive units are transmitted to the respective drive units via common network. In one embodiment no correction value is transmitted to the drive unit of the folder, since its position is used as a

reference.

WO 97/11848 shows the architecture of a drive system, in accordance with which the individual drive units of the printing press are connected with an electronic shaft via a first bus, and additionally with a parametrization bus for parametrization. It criticizes the drive architecture of EP 0 567 741 A1, wherein the guide system is split into a higher-order guide system and autonomous print location groups, wherein the synchronization of the print location groups takes place from a folder.

A drive system for a printing press is disclosed in 2002/124743, wherein drive data specifications are output to drive control units assigned to respective individual motors by means of data processing devices by a central operating and control unit via a data network.

The object of the invention is based on creating drive unit arrangements and methods for driving a processing machine.

In accordance with the invention, this object is attained by means of the characteristics of claims 1, 4, 15, or 30, 31, 33, 43 and 45.

The advantages which can be gained by means of the invention lie in particular in that by using the position reference of the electronic master shaft it is easier to manipulate errors regarding measuring systems and/or mechanical drive systems occurring in the printing units, as well as the folder. Because of the lack of interaction and the reference to a common master shaft it is possible to set

offset values for the drive units of the printing units, as well as for the folder, in respect to the master shaft and, in an advantageous embodiment, to specify them for a defined type of production (web track).

An embodiment is of advantage wherein an offset value in respect to the master shaft can be set, or specified, for each rotatory drive unit of the print units (at least the drive units of the forme cylinders, which are driven independently of other forme cylinders) and the folder. These offset values are set, for example in the respective drive controller of the drive unit, or preferably in a lower-order drive control unit, or are stored there as offset. The specification of a defined offset value can be entered or changed, for example, at a control console and/or can be stored there for a defined type of production, and can be called up there, and thereafter transmitted to the drive controllers or the lower-order drive control units.

The embodiment is of advantage, wherein the processing of the control signals for all relevant drive units does not take place in a higher-order drive control unit, but wherein only a higher-order master shaft movement is transmitted by this drive control unit. The specific processing for an

4. A drive unit arrangement of a processing machine, having a plurality of units (01, 02, 04, 06, 07) which are driven, mechanically independently of each other, by drive motors (M) via drive units (08) assigned to each one of them, and having at least one first signal line (09) connecting the drive units (08), or a lower-order drive control unit (17) of these units (01, 02, 04, 06, 07), which carries signals from a master shaft position (Phi) of a virtual master shaft (a, b) generated by a higher-order drive control unit (13, 17), characterized in that at least one lower-order drive control unit (17) is provided between the higher-order drive control unit (13, 17) and the drive unit (08), to which signals regarding the actual master shaft position (Phi) and/or the master shaft movement are transmitted via the signal line (09), and which is designed to perform the specific processing of control signals for at least one of the individual drive units (08) assigned to this lower-order drive control unit (17) by using the actual master shaft position (Phi) and/or the master shaft movement, and an offset (Delta $Phi_i$) can be transmitted to the drive units (08) or to a lower-order drive control unit (17) via at least one second signal line (14), which differs from the first signal line (09), which offset defines a displacement of a angular position set point ($Phi_i'$) in respect to the master shaft position (Phi, Phia, Phib).

5. The drive unit arrangement in accordance with claim 3 or 4, characterized in that through the lower-order drive

control unit (17) it is possible to provide several drive control units (08), which are assigned to this drive control unit (17) and participate in the productions run, specific angular position set points ($Phi_i'$) addressed to them.

6. The drive unit arrangement in accordance with claim 1 or 4, characterized in that the offset (Delta $Phi_i$) represents a permanent, but changeable displacement of the angular position set point ($Phi_i'$) in respect to the master shaft position (Phi, Phia, Phib).

7. The drive unit arrangement in accordance with claim 1 or 4, characterized in that at least one drive unit (08) of a printing group (03), which prints on the web, and a drive unit (08) of a downstream connected unit (06), which further processes the web, are respectively connected with the signal line (09), and an offset (Delta $Phi_i$) can be assigned to each one of these two drive units (08).

8. The drive unit arrangement in accordance with claim 1 or 4, characterized in that each of the drive units (08) is connected via a lower-order drive control unit (17) with the signal line (09).

9. The drive unit arrangement in accordance with claim 7, characterized in that the further processing unit (06) is a folder (06).

10. The drive unit arrangement in accordance with claim 1 or 4, characterized in that at least all drive units (08), which are assigned to a specific web track for the rotary driving of units (01, 02, 03, 04, 06, 07) and which must meet the requirement of keeping registration in the conveying direction of the web, are connected with a common signal line (09).

11. The drive unit arrangement in accordance with claim 10, characterized in that an offset (Delta $Phi_i$) is

assigned to at least these drive units (08).

12. The drive unit arrangement in accordance with claim 1 or 4, characterized in that the offset value (Delta $Phi_i$) of a unit (01, 02, 03, 04, 06, 07) specifying the master shaft position (Phi) is zero.

13. The drive unit arrangement in accordance with claim 1, characterized in that several of the drive units (08) of these units (01, 02, 03, 04, 06, 07) which are driven

mechanically independently of each other is connected via a common lower-order drive control unit (17) with the signal line.

14. The drive unit arrangement in accordance with claim 13, characterized in that several of the drive units (08) with their units (01, 02, 03, 04, 06, 07) form a group (18).

15. A drive unit arrangement of a processing machine, having a plurality of units (01, 02, 03, 04, 06, 07) which are rotatorily driven, mechanically independently of each other, by drive motors (M), respectively in relation to a master shaft position (Phi), wherein drive control units (08), each embodied as drive unit (08) with drive control, are assigned to the drive motors (M), characterized in that a higher-order drive control unit (13), which specifies the master shaft position (Phi) is provided. that a lower-order drive control unit (17) is arranged between the drive units (09) of a group (18) of units (01, 02, 03, 04, 06, 07) of the higher-order drive control unit (13), which is assigned to all units (01, 02, 03, 04, 06, 07) of this group (18), which is embodied to perform a specific processing of control signals for drive units (08) assigned to this group (18), using the actual master shaft position (Phi) and/or the master shaft movement, as well as offset value (Delta $Phi_i$) assigned to the individual drive units (08).

16. The drive unit arrangement in accordance with claim 14 or 15, characterized in that the group (18) has several printing groups (03).

17. The drive unit arrangement in accordance with claim 14 or 15, characterized in that the group (18) has several sub-groups (02), in particular printing units (02), each with at least one printing group (03).

18. The drive unit arrangement in accordance with claim 14 or 15, characterized in that the drive units (08, 09) of the group (18) can be assigned to different master shafts (a, b).

19. The drive unit arrangement in accordance with claim 15, characterized in that a signal line (09) is provided, which carries the signals regarding the actual master shaft position (Phi) and/or master shaft movement.

20. The drive unit arrangement in accordance with claim 1, 4 or 19, characterized in that the signal line (09) carries signals regarding the master shaft position (Phi, Phia, Phib) of several virtual master shafts (a, b).

21. The drive unit arrangement in accordance with claim 17 and 20, characterized in that the drive units (08) of the sub-groups (18) receive angular position set points ($Phi_i'$) in respect to different virtual master shafts (a, b).

22. The drive unit arrangement in accordance with claim 1 or 4, characterized in that the specific offset values (Delta $Phi_i$) are specified in the drive control unit (13, 17).

23. The drive unit arrangement in accordance with claim 1 or 4, characterized in that the specific offset

values (Delta $Phi_i$) are specified in the lower-order drive control unit (13, 17).

24. The drive unit arrangement in accordance with claim 22 or 23, characterized in that specific angular position set points ($Phi_i'$) for the individual drive units

(08) are formed in the drive control unit (13, 17) from the master shaft position (Phi, Phia, Phib) and the specific offset value (Delta $Phi_i$) and are fed to the respective drive units (08).

25. The drive unit arrangement in accordance with claim 1 or 4, characterized in that the units (01, 02, 03, 04, 06, 07) are connected with each other and with a computing and data processing unit (11) via the signal line (14), which is different from the signal line (09).

26. The drive unit arrangement in accordance with claim 25, characterized in that the offset values (Delta $Phi_i$) are fed to the lower-order drive control units (17) via this signal line (14).

27. The drive unit arrangement in accordance with claim 25, characterized in that a communication between the computing and data processing unit (11) and the units (01, 02, 03, 04, 06, 07), at least regarding set point specifications and transmission of actual values for actuating members and/or drive units of the units (01, 02, 03, 04, 06, 07) which are different from the drive units (08), is provided via this signal line (14).

28. The drive unit arrangement in accordance with claim 1 or 4, characterized in that an operating unit is provided, into which the offset values (Delta $Phi_i$) can be

29. The drive unit arrangement in accordance with claim 1 or 4, characterized in that a memory unit is provided, in which the offset values (Delta $Phi_i$) for the individual drive units regarding a specific production run can be stored and can be read out from it when required.

30. A method for driving a processing machine, wherein a plurality of units (01, 02, 03, 04, 06, 07) are driven,

mechanically independent of each other, by drive units (08), and signals from a master shaft position (Phi) of a virtual master shaft (a, b) are carried in at least one signal line (09), which connects these units (01, 02, 03, 04, 06, 07), characterized in that an offset (Delta $Phi_i$) is assigned to each of the drive units (08), which defines a permanent, but changeable displacement of an angular position set point (Delta $Phi_i$') in respect to the master shaft position (Phi, Phia, Phib), that prior to the start-up of the processing machine the master shaft position (Phi) is aligned in accordance with the actual angular position of one of the units (01, 02, 03, 04, 06, 07), that during the operation of the processing machine the master shaft position (Phi) is specified by a higher-order drive control unit (13, 17), which is connected with the signal line (09) and, at any time during the operation, specifies the position, and all coupled drive units (08), including the drive unit (08) used for aligning the master shaft a, b, follow this position during the operation.

31. A method for driving a processing machine, wherein a plurality of units (01, 02, 03, 04, 06, 07) is driven, mechanically independent of each other, by drive units (08), and signals from a master shaft position (Phi) of a virtual master shaft (a, b) are carried in at least one signal line (09), which connects these units (01, 02, 03, 04, 06, 07), characterized in that an offset (Delta $Phi_i$) is assigned to each of the drive units (08), which defines a permanent, but

changeable displacement of an angular position set point (Delta $Phi_i'$) in respect to the master shaft position (Phi, Phia, Phib), that prior to the start-up of the processing machine the master shaft position (Phi) is aligned by means of its position it had occupied last and which is stored, that during the operation of the processing machine the master shaft position (Phi) is specified by a higher-order drive control unit (13, 17), which is connected with the

signal line (09), and all couple drive units (08), which have a requirement for maintaining registration, are thereafter aligned, corresponding to their preset conditions in respect to the offset values (Delta $Phi_i$), in accordance with this.

32. The method in accordance with claim 31, characterized in that following the stopping of the processing machine the last master shaft position (Phi) taken up is stored in a memory unit, and the master shaft position (Phi) is aligned by means of this stored master shaft position (Phi) prior to the next start-up.

33. A method for driving a processing machine, wherein a plurality of units (01, 02, 03, 04, 06, 07) are driven, mechanically independent of each other, by drive units (08), and signals from a master shaft position (Phi) of a virtual master shaft (a, b) are carried in at least one signal line (09), which connects these units (01, 02, 03, 04, 06, 07), characterized in that the master shaft position (Phi) is specified by the angular position of a printing group (03), and that an offset (Delta $Phi_i$) is assigned to at least the remaining drive units (08) associated with the production run, which determines a permanent, but changeable displacement of an angular position set point ($Phi_i'$) in respect to the master shaft position (Phi, Phia, Phib).

34. The method in accordance with claim 33, characterized in that prior to the start-up of the processing

machine, the master shaft position (Phi) is aligned in accordance with the actual angular position of a printing group (03).

35. The method in accordance with claim 34, characterized in that during the operation of the processing machine, the master shaft position (Phi) continues to be specified by the angular position of the printing group (03).

36. The method in accordance with claim 34, characterized in that during the operation of the processing machine, the master shaft position (Phi) is specified by a higher-order drive control unit (13, 17), which is connected with the signal line (09).

37. The method in accordance with claim 33, characterized in that during the operation of the processing machine, the master shaft position (Phi) is specified by a drive control unit (17) assigned to the printing group (03).

38. The method in accordance with claim 33, characterized in that prior to the alignment of the master shaft position (Phi), one of several possible printing groups (03) is selected as reference.

39. The method in accordance with claim 30 or 31, characterized in that during the operation an angular position set point ($Phi_i'$) approximating the master shaft position (Phi) generated by the drive control unit (13, 17) is specified for at least all rotatory drive units (08) of units (01, 02, 03, 04, 06, 07), which are assigned to a specific web track and which must meet the requirement of keeping registration in the conveying direction of the web.

40. The method in accordance with claim 30, 31 or 33, characterized in that an offset (Delta $Phi_i$) is respectively assigned to at least one drive unit (08) connected with the

signal line (09) of a printing group (03) printing on the web, and to the drive unit (08) connected with the signal line (09) of a downstream located unit (06), which processes the web further.

41. The method in accordance with claim 30 or 31, characterized in that during the operation of the processing

machine the master shaft position (Phi) is specified, independently of an actual angular position of one of the units (01, 02, 03, 04, 06, 07), only by the drive control unit (13, 17).

42. The method in accordance with claim 30, 31 or 33, characterized in that the specific offset values (Delta $Phi_i$) are specified in the drive control unit (13, 17).

43. A method for driving a processing machine, wherein a plurality of units (01, 02, 03, 04, 06, 07) are driven, mechanically independent of each other, by drive units (08), characterized in that only signals of a master shaft position (Phi) of a virtual master shaft (a, b), which has not yet been adapted to the relative angular position set point of the individual drive units (08), are carried in a first signal line (09), and that in a second signal line (16, 16', 14, 25, 27) a specific offset (Delta $Phi_i$) is transmitted to each of the drive units (08) or to a lower-order drive control unit (17) of these units (01, 02, 03, 04, 06, 07), which specifies a displacement of an angular position set point ($Phi_i'$) in respect to the master shaft position (Phi, Phia, Phib).

44. The method in accordance with claim 43, characterized in that the relevant master shaft position (Phi), which is relevant for the units (01, 02, 03, 04, 06, 07) participating in a production run, is issued by a higher-

order drive control unit (13), and that the updating of the specific angular position set points for the individual drive units (08) of the units (01, 02, 03, 04, 06, 07) is only performed in the lower-order drive control unit (17), which transmits the specific angular position set points to the regulating unit (08) of the individual units (01, 02, 03, 04, 06, 07) as a specification.

45. A method for driving a processing machine, wherein a plurality of units (01, 02, 03, 04, 06, 07) is driven, mechanically independent of each other, by drive units (08),

characterized in that only signals of a master shaft position (Phi) of a virtual master shaft (a, b), which has not yet been adapted to the relative angular position set point of the individual drive units (08), are carried in a first signal line (09), that the master shaft position (Phi) is specified by a higher-order drive control unit (13), that this master shaft position (Phi) is provided to a lower-order drive control unit (17) which is different from the drive units (08), and that this lower-order drive control unit (17) determines a guide value for the positioning of the respective unit or its respective drive unit (08) and issues it to a group of several units (01, 02, 03, 04, 06, 07) on the basis of the master shaft position (Phi) and a respective specific offset (Delta $Phi_i$).

46. The method in accordance with claim 30, 31, 33, 43 or 45, characterized in that the specific offset values (Delta $Phi_i$) are specified in a lower-order drive control unit (13, 17), which is assigned to several drive units (08) which are located together downstream.

47. The method in accordance with claim 30, 31, 33, 43 or 45, characterized in that specific angular position set points ($Phi_i'$) are formed from the master shaft position (Phi, Phia, Phib) for the individual drive units (08) in the drive control unit (13, 17) and are supplied to the drive units (08) involved.

48. The method in accordance with claim 30, 31, 33, 43 or 45, characterized in that the specific offset values (Delta $Phi_i$) are specified in the individual drive units (08), and that specific angular position set points ($Phi_i'$) are formed there from the master shaft position (Phi, Phia, Phib) and the specific offset values (Delta $Phi_i$).

49. The method in accordance with claim 30, 31, 33, 43 or 45, characterized in that the offset values (Delta $Phi_i$) are entered at an operating unit.

50. The method in accordance with claim 30, 31, 33, 43 or 45, characterized in that the offset values (Delta $Phi_i$) for the individual drive units (08) for a specific production run are stored in a memory unit and are read out from it when required.

51. The method in accordance with claim 30, characterized in that prior to the start-up of the processing machine the master shaft position (Phi) is aligned by means of the actual angular position of a as a folder (07).